

WHAT IS CLAIMED IS:

- 1           1. A computer-implemented method for maintaining consistent unit relationships  
2     in a pharmacological computational model editor, comprising:
  - 3           (a)     presenting a graphical user interface having a plurality of objects, each  
4                    object representing one or both of a pharmacokinetic element and a  
5                    pharmacodynamic element;
  - 6           (b)     receiving instructions via the graphical user interface for connection of at  
7                    least two of the objects;
  - 8           (c)     displaying the at least two objects connected in accordance with the  
9                    received instructions, the connected objects having an input and an output;
  - 10          (d)     receiving units-specifying data for at least one of an input and an output  
11                   for the connected objects;
  - 12          (e)     converting the at least two connected objects and the received units-  
13                   specifying data into an internal format corresponding to the  
14                   pharmacokinetic and pharmacodynamic elements represented by the at  
15                   least two connected objects, wherein the converting step (e) occurs  
16                   substantially coincident with the object displaying step (c), the internal  
17                   format comprising statements having terms, at least one of the terms  
18                   having an associated multidimensional unit type corresponding to the  
19                   received units-specifying data;
  - 20          (f)     propagating the multidimensional unit type data for each statement;
  - 21          (g)     identifying inconsistent units in the propagated multidimensional unit type  
22                   data; and
  - 23          (h)     displaying one or more warning messages on the graphical user interface  
24                   regarding the identified inconsistent units.
- 1           2. The method of claim 1, wherein the internal format comprises a parse tree.
- 1           3. The method of claim 1, wherein the one or more warning messages are  
2     displayed in proximity with one or more corresponding objects which are the source of

3 the identified inconsistent units.

1 4. The method of claim 1, wherein the objects comprise one or more of  
2 compartment blocks, flow blocks, response blocks, and formulation blocks.

1 5. The method of claim 1, wherein each multidimensional unit type comprises a  
2 plurality of exponential powers, each exponential power corresponding to a unit category,  
3 and wherein each multidimensional unit type indicates for the respective corresponding  
4 terms either a units definition or an absence of units definition.

1 6. The method of claim 5, wherein each exponential power is an integer selected  
2 from the range -4 to 3 inclusive.

1 7. The method of claim 5, wherein each unit category includes a plurality of unit  
2 names, each multidimensional unit type further comprising a conversion factor for  
3 conversion of a data value to a set of default units, each default unit selected from a unit  
4 category.

1 8. The method of claim 7, wherein at least one unit category is selected from the  
2 group comprising volume, weight, time, quantity, and age.

1 9. A computer readable medium having stored thereon one or more sequences of  
2 instructions for causing one or more processors to perform steps for maintaining  
3 consistent unit relationships during pharmacological computational model construction,  
4 the steps comprising:

5 (a) presenting a graphical user interface having a plurality of objects, each  
6 object representing one or both of a pharmacokinetic element and a  
7 pharmacodynamic element;

8 (b) receiving instructions via the graphical user interface for connection of at  
9 least two of the objects;

10 (c) displaying the at least two objects connected in accordance with the  
11 received instructions, the connected objects having an input and an output;

- 12 (d) receiving units-specifying data for at least one of an input and an output  
13 for the connected objects;  
14 (e) converting the at least two connected objects and the received units-  
15 specifying data into an internal format corresponding to the  
16 pharmacokinetic and pharmacodynamic elements represented by the at  
17 least two connected objects, wherein the converting step (e) occurs  
18 substantially coincident with the object displaying step (c), the internal  
19 format comprising statements having terms, at least one of the terms  
20 having an associated multidimensional unit type corresponding to the  
21 received units-specifying data;  
22 (f) propagating the multidimensional unit type data for each statement;  
23 (g) identifying inconsistent units in the propagated multi-dimensional unit  
24 type data; and  
25 (h) displaying one or more warning messages on the graphical user interface  
26 regarding the identified inconsistent units.

1 10. The computer readable medium of claim 9, wherein the internal format  
2 comprises a parse tree.

1 11. The computer readable medium of claim 9, wherein the one or more warning  
2 messages are displayed in proximity with one or more corresponding objects which are  
3 the source of the identified inconsistent units.

1 12. The computer readable medium of claim 9, wherein the objects comprise one  
2 or more of compartment blocks, flow blocks, response blocks, and formulation blocks.

1 13. The computer readable medium of claim 9, wherein each multidimensional  
2 unit type comprises a plurality of exponential powers, each exponential power  
3 corresponding to a unit category, and wherein each multidimensional unit type indicates  
4 for the respective corresponding terms either a units definition or an absence of units  
5 definition.

1           14. The computer readable medium of claim 13, wherein each exponential power  
2 is an integer selected from the range -4 to 3 inclusive.

1           15. The computer readable medium of claim 13, wherein each unit category  
2 includes a plurality of unit names, each multidimensional unit type further comprising a  
3 conversion factor for conversion of a data value to a set of default units, each default unit  
4 selected from a unit category.

1           16. The computer readable medium of claim 15, wherein the unit categories  
2 comprise two or more of volume, weight, time, quantity, and age.

1           17. A system configured to present a graphical user interface having a plurality of  
2 objects, each object representing one or both of a pharmacokinetic element and a  
3 pharmacodynamic element, the system further configured to maintain consistent unit  
4 relationships during pharmacological computational model construction, the system  
5 comprising:

- 6           (a) a processor;  
7           (b) a data storage area; and  
8           (c) an execution area configured to:  
9               (i) receiving instructions regarding connection of at least two of the  
10               objects;  
11               (ii) displaying the connected objects in accordance with the  
12               instructions;  
13               (iii) receiving units-specifying data for at least one of an input and an  
14               output for the connected objects;  
15               (iv) converting the connected objects and the units-specifying data into  
16               an internal format corresponding to the pharmacokinetic and  
17               pharmacodynamic elements represented by the connected objects,  
18               in parallel with the object display, wherein the internal format  
19               comprises statements having terms, and wherein at least one of the

20 terms has an associated multidimensional unit type corresponding  
21 to the units-specifying data;  
22 (v) identifying inconsistent units by propagation of the  
23 multidimensional unit type data for each statement; and  
24 (vi) displaying one or more warning messages for the identified  
25 inconsistent units.

1 18. The computer system of claim 17, wherein each multidimensional unit type  
2 comprises a plurality of exponential powers, each exponential power corresponding to a  
3 unit category, and wherein each multidimensional unit type indicates for the respective  
4 corresponding terms either a units definition or an absence of units definition.

1 19. The computer system of claim 18, wherein each unit category includes a  
2 plurality of unit names, each multidimensional unit type further comprising a conversion  
3 factor for conversion of a data value to a set of default units, each default unit selected  
4 from a unit category.

1 20. The computer system of claim 19, wherein each exponential power is an  
2 integer selected from the range -5 to 5 inclusive.